

Topic 6 – Diabetes, Lipids, metabolism – B

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0145

Involvement of the sympathetic nervous system in the development of metabolic disorders

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Introduction: If sympathetic hyperactivity seems to be associated to several components of the metabolic syndrome, its involvement in the development of metabolic syndrome has not been clearly defined.

Aim: It was to determine if a chronic increase of the sympathetic nervous activity is a sufficient condition for the development of metabolic disorders. For that purpose, we used a transgenic mouse model, in which the gene coding for the reuptake norepinephrine transporter (NET) has been deleted; these animals display increased plasma catecholamine rates, associated to slight increases in blood pressure and heart rate. We focused on the consequences of this sympathetic hyperactivity on glucose and lipid metabolism in this mouse model.

Methods: Heterozygous NET knockout mice (+/-) or wild-type mice (+/+) were fed either with a normal chow or a 30% w/v fructose in drinking water during a period of 15 weeks to induce metabolic disorders. Metabolic parameters (plasma triglycerides and total cholesterol, intraperitoneal glucose tolerance test, IPGTT) were measured after a 4h fasting period before treatment and then repeated every 5 weeks.

Results: No significant difference on triglycerides or cholesterol rates could be detected after the 15 weeks period. Heterozygous mice displayed clear glucose intolerance already before starting the fructose diet (area under the curve (%)=25434 vs 20822, $p=0.013$ for +/- and +/+ mice respectively). These animals were also much more sensitive to high fructose, since a 50% increase in the area under the curve of the IPGTT was obtained at the end of the high fructose diet, compared to the 11% increase in +/+ mice.

Conclusion: Our data suggest that constitutive chronic sympathetic hyperactivity can induce the early development of carbohydrate metabolism disorders. Moreover, it seems to represent a major factor of susceptibility to diet-induced metabolic dysfunction.

0349

Comparison of bioimpedance and X-ray micro-computed tomography (μ CT) for total fat volume measurement in mice in vivo

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Introduction: Determination of adipose tissue proportion, as well as its spatial distribution, is a major part of metabolic syndrome assessment. Various methods, commonly used in mouse models, are either indirect measurement, invasive (destructive) or imaging techniques. Indirect measurement techniques, such as deuterium dilution (considered as gold standard) or bioimpedance are based on the measurement of body composition. They give access to the measure of total body fat, without distinction between visceral and subcutaneous fat volumes. Sacrifice and ex-vivo tissue weight allow both total fat measurement and partition between subcutaneous and visceral fat pad. It is a

direct method that does not allow for longitudinal studies. Non-invasive micro-imaging modalities (magnetic resonance imaging and μ CT) add, over others, the advantage of spatial localization of fat, in vivo.

Aim: Of our study was to compare results of measurements of total body fat done by μ CT and bioimpedance in mice.

Methods: μ CT was done using a dedicated in vivo imaging instrument (eXplore Vision 120, GE, USA) on 30 anesthetized mice. Each acquisition lasted approximately 12 min. Just after μ CT, measurement of body composition was performed by bioimpedance (ImpediVET, ImpediMed, USA).

Results: The average value of total body fat by μ CT is 5% higher than that obtained by bioimpedance. The standard deviation calculated from μ CT measurements is lower than that obtained with bioimpedance (4.8% vs 6.8% respectively). The linear correlation of μ CT and bioimpedance measure of total adipose tissue is moderate ($r^2 = 0.55$).

Conclusion: It is the first time, to our knowledge, that a comparison of total fat volume measurement between μ CT and bioimpedance is performed in mice. Surprisingly, the correlation appears not to be so trivial between the 2 methods. Before a deeper exploration, comparison of results obtained with these 2 methods should be made with caution.

0366

Prevalence of the metabolic syndrome in psoriasis patients: moroccan experience

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Background: Psoriasis is a chronic inflammatory disease associated with multiple comorbidities that are components of the metabolic syndrome (MS). Several studies have objectified a high prevalence of MS in psoriasis patients.

Objective: To determine the prevalence of MS and its components in psoriasis patients compared with controls, also the factors determinants the occurrence of MS in our patients.

Patients and Methods: This was a prospective study including 100 psoriasis patients versus 100 controls seen in consultation or in hospitals. Conducted for a period of 12 months.

Results: The prevalence of MS was higher in patients with psoriasis compared with controls (OR=2.89, $p=0.0002$). With a significant increase in obesity (OR=3.25, $p=0.001$), hypertriglyceridemia (OR=3.9, $p=0.013$) and glucose intolerance (OR = 2.13, $p = 0.046$). Risk factors determining the appearance of SM in psoriatic were age, family history of psoriasis, seniority of psoriasis, but we did not find a correlation with sex, severity of psoriasis and the clinical form.

Conclusion: The management of psoriasis will integrate research risk factors for a possible metabolic syndrome and its treatment through a multidisciplinary approach.

0096

Adipocyte mineralocorticoid receptor activation leads to metabolic syndrome and induction of prostaglandin D2 synthase

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Metabolic Syndrome (MetS) is a cluster of metabolic risk factors, including visceral obesity and insulin resistance (IR), associated with a higher